

REMARKS

Review and reconsideration of the Office Action of February 23, 2005, is respectfully requested in view of the above amendments and the following remarks.

Claim 8, as amended, finds support in paragraph [0014] of the specification (first line of page 6).

New Claim 19 represents the combination of Claims 1+3+4 (specification, paragraph [0007], and Fig. 3). New Claim 20 represents the combination of Claims 1+3+5 (Fig. 4).

Applicant would like to thank the Examiner for the detailed and helpful comments regarding the claims. Applicant has carefully reviewed and corrected the claims.

Present Invention

The present invention concerns an improvement in engine efficiency in general, and in sheet metal turbine housings in particular.

A turbocharger is generally provided as one component of an engine system. The engine system generally also includes a catalytic converter in the exhaust pipe for reduction of noxious emissions. To function efficiently, the catalyst must be brought up to its operating temperature using heat from the engine exhaust, which first passes through the turbine of the turbocharger. Thus, the efficiency of one component (catalytic converter) may depend upon the design of a different component of the system (turbocharger).

It is known that sheet metal turbine housings are easy to manufacture and are light weight as compared with cast turbine housings. It is also known that they have a lower heat capacitance. By absorbing less heat after light-off of the engine, heat is passed more quickly to the catalytic converter, bringing it up to its efficient operating temperature more quickly.

However, when these cast or sheet metal elements are connected by flange means, a **gasket** is usually provided to

prevent exhaust gas leakage, which gasket **interrupts thermal conductivity** and heat transfer.

The present inventors considered that additional benefits could be realized by further improving the design of the turbocharger turbine housing to reduce the heat losses on the way up to the catalyst.

The prior art does not provide any teaching as to how to solve the problem addressed by the present inventors.

The present invention is achieved according to Claim 1 in that:

- not only the **turbine housing**, but also a **branch pipe (4')**, is of sheet metal, and
- the housing jacket and the connection pipe have **a heat conductive interconnection**.

In short: (a) the heat absorption capacity is smaller than with a cast housing plus conventional cast connection pipe, and (b) the heat conductive interconnection allows good heat transfer.

Further advantages result from the **sliding connection** design that allows simplified assembly, greater heat transfer, and a relative movement of the parts without losing the heat transferring contact, i.e., claims 3 (sliding connection), 4 (sliding connection comprises conical widening portion), and 5 (sliding connection involves two cylinders) and independent claims 19 (Claim 1+3+4) and 20 (Claim 1+3+5)):

- the conventional flange connection is no longer necessary, which leads to a certain reduction in weight;
- without a flange, mounting is facilitated, because that space which was necessary for mounting flange bolts, is no longer needed which means also that the housing arrangement can be more compact;
- a flange sealing is no longer necessary;
- while a great number of welding seams were necessary adjacent to the flange connection, this number is greatly reduced with the design according to the present invention.

As defined in claims 4, 5 and 20 ($20 = 1 + 4 + 5$), the sliding connection comprises a conical enlargement on one of the tubular parts, particularly the housing, into which the other tubular part can be inserted. In this way, cumbersome mounting procedures are omitted, the parts are merely inserted into one another, but still have the possibility of a sliding relative movement due to heat expansion, vibration and so on.

The invention having been accomplished as discussed above, even further improvements can be achieved when the housing (6, 7) consists of at least two layers of sheet metal arranged one outside of the other, wherein **the outer one (22) is preferably thicker than the inner one (6)**. Prior art showing a sheet metal shield around a turbine housing shows a conventional thick turbine housing and a thin metal envelope.

Office Action

Turning now to the Office Action in greater detail, the paragraphing of the Examiner is adopted.

Claim Objections/Corrections

The Examiner objects to Claims 1, 5 and 6. The position of the Examiner can be found on page 2 of the Office Action.

Regarding the requirement to insert "an" before --exhaust manifold system-- in Claim 1, Applicants respectfully submit that the claims are directed to one single system comprising turbocharger and exhaust manifold. Claim 1 recites a branch pipe (4') which is part of the exhaust gas manifold. Accordingly, it is submitted that the claims are properly directed to one system comprising at least two parts - turbocharger and exhaust manifold, and thus there should only be one "an" in the preamble of Claim 1.

The term "housing" has been deleted from Claim 1 line 5.

Claims 5 and 6 have been corrected.

Withdrawal of the rejection is respectfully requested.

Claim Rejections (35 USC §112)

Claim 8 is rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

Claim 8 is amended, based on paragraph [0014] of the specification (first line of page 6).

Claim Rejections (35 USC §102(a) or §103)

Claim 1 is rejected under 35 U.S.C. 102(b) as anticipated by, or in the alternative, under 35 U.S.C. 103(a) as obvious over Kirchweger et al. (Patent No. 4,194,484).

The Examiner's position can be found in page 3, last paragraph and page 4, first two paragraphs, of the office action. The Examiner contends that the limitation of "turbine housing and at least the branch pipe means for connection with the exhaust manifold being made of sheet metal" is considered as product by process claim. Thus, the Examiner alleges that the product described in Kirchweger appears to be identical to the instant invention, although produced by a different process. Therefore, the Examiner requires Applicants to overcome forward with evidence establishing distinctiveness between the two, according to *In re Marosi*.

Applicants respectfully traverse.

Most importantly, the present invention concerns a design modification for a turbocharger and exhaust system in order to be able to bring a catalytic converter up to efficient operating temperature as quickly as possible. This is done by

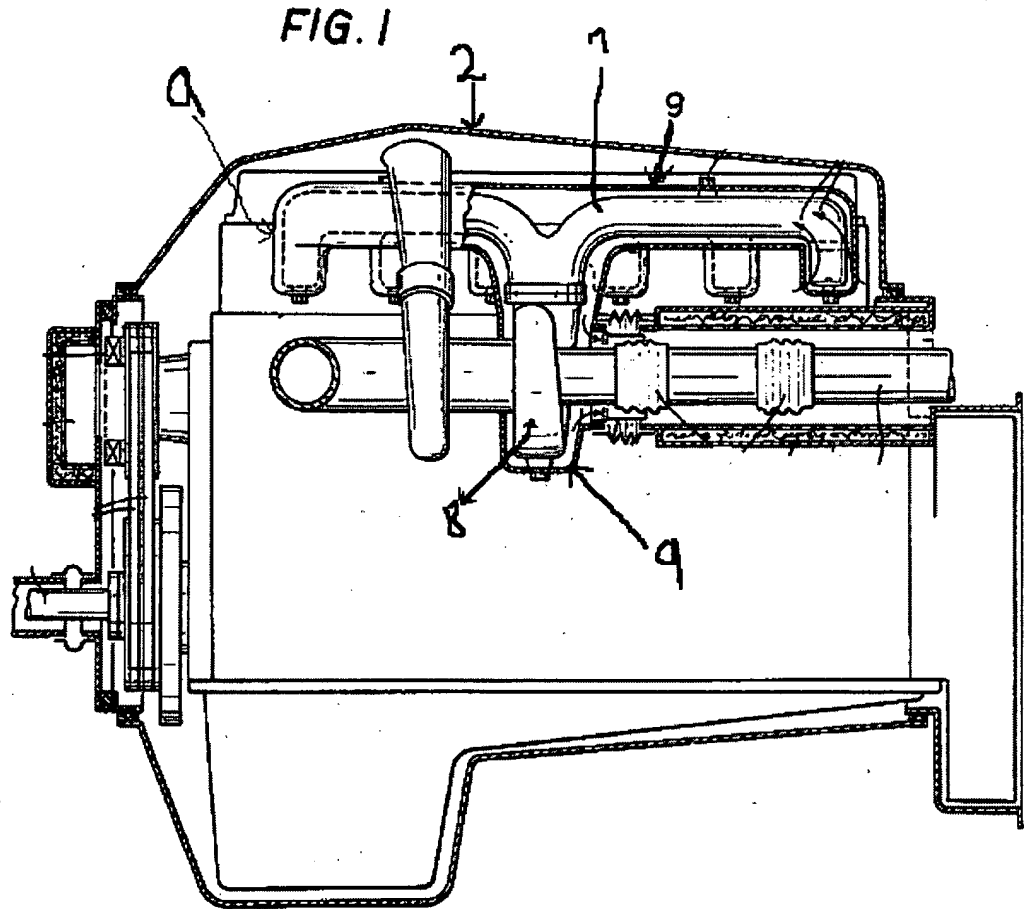
making the turbine housing and a branch pipe of sheet metal to reduce heat absorption and to have these pieces form a thermal connection to promote heat transfer, thereby being designed to expedite delivery of heat to the catalytic converter. Kirchweger et al have no teaching of this concept or design modification relevant to the present invention. Thus, this reference does not anticipate.

Further, the present claims are functional language claims, not product by process claims. *In re Marosi* does not apply to this case. In *In re Marosi*, there are two products that are clearly identical, whereas in the present case, the product in Kirchweger is neither identical nor similar to the instant invention.

Kirchweger describes a noise suppressing encapsulation with a blower for ventilation, wherein there is single encapsulation or jacket for the exhaust pipe and the turbine (see abstract). The jacket is described as made of sheet metal spaced away from the exhaust pipes and the turbine (see column 1, lines 43 to 50).

This is better illustrated by the following graphical representation. In the Figure below (Kircheweger's) only items 2, 7, 8 and 9 are represented.

Kirchweger's invention is specifically directed to items 2 and 9 which are the encapsulation and the jacket (column 1, lines 41 to 54, and claim 1) respectively.



The Examiner asserts that Kirchweger discloses a gas pipe for connecting said turbine housing to at least one piece of an exhaust gas manifold of a combustion motor.

But the only thing which could be seen or described in Kirchweger is that there is a turbine housing 8, which appears to be a cast iron and not a sheet metal housing, and which is implicitly connected to the exhaust manifold 7, apparently by a flange means and not a sliding connection. Those working in this art would know that a flange connection requires a gasket, and that a gasket is generally heat insulative and not thermally conductive, as required in present claim 1.

The only thing that Kirchweger discloses is that in the space between the jacket 9 and the turbine-exhaust manifold system 7, 8 there is ventilation by a blower ("a partial air stream flowing") (see column 1, lines 44-46), **with the function of cooling down the space between the jacket and the manifold.** This has no relevance to the issue of a thermal connection between the turbine housing and the exhaust manifold pieces.

In contrast to what is described in the Applicant's invention, in the art of turbochargers, usually, the turbine housing is connected to the exhaust manifold through flanges tightened against each other by screws. A connection by flanges would dissipate the thermal conductivity between the turbine housing and the manifold parts.

In addition, the Examiner acknowledges that Kirchweger does not teach (1) a turbine-housing and (2) at least a branch pipe for connection **made of sheet metal.** The only thing that Kirchweger describes as made of sheet metal is the jacket 9. In Kirchweger, there is no mentioning at all with respect to the materials which the turbine and its parts are made of. The only way Kirchweger refers to the "turbine" is as part of the "exhaust system" (e. g., see column 1, lines 43-46).

The Examiner does not specify which product he is referring to when he mentions "a prior art product that appears to be identical". Is the Examiner referring to A) the jacket made of sheet metal or B) the turbine housing which Kirchweger does not disclose what is made of.

In contrast, *In re Marosi* refers to two comparable products, two zeolite compounds essentially free of alkali metal (see *In re Marosi* at page 803, second paragraph).

The sheet metal jacket 9 of Kirchweger (A) is not comparable with the sheet metal turbine housing and branch pipe of the present invention. It is evident that they are different products.

Likewise, the turbine housing 8 made of unknown materials in Kirchweger (B) can not be compared to the turbine housing and the branch pipe of the present invention made of sheet metal, since it is also evident that these are different products.

Therefore, Applicants must submit to the Examiner that *In re Marosi* does not apply to the instant case.

Turning to the anticipation rejection, for a reference to anticipate it must disclose each and every single element of the invention.

As the Examiner acknowledges; Kirchweger does not teach "the turbine housing and at least the branch pipe means for connection with the exhaust manifold being made of sheet metal" (see page 4 of the office action).

Kirchweger does not teach sheet metal turbine housing, sheet metal branch pipe, or that the branch pipe sheet metal is in thermal connection with the turbine housing sheet metal.

Thus, Kirchweger does not anticipate the present invention.

Claim 1 is not anticipated under 35 U.S.C. § 102(b), or in the alternative, is not obvious under 35 U.S.C. § 103(a) over Kirchweger.

The Examiner next rejects claim 1 under 35 U.S.C. § 103(a) as being unpatentable over Kirchweger et al. (Patent

Number 4,194,484), in view of Davis (Pub. Number 2002/0100289 A1), and in view of Wolf et al. (Patent Number 5,816,043).

The Examiner's position can be found at page 4, last paragraph and page 5 of the Office Action.

Applicants respectfully traverse.

As the Examiner acknowledges, Kirchweger does not teach that "the turbine housing and at least the branch pipe means for connection with the exhaust manifold being made of sheet metal" (which is an essential characterizing feature of the present invention). Moreover, Kirchweger does not expressly teach either that the exhaust gas manifold pieces are in thermal connection with said turbine housing.

With respect to Davis, the Examiner contends that it is conventional in the blower cover art, to utilize the housing being made of sheet metal.

However, with regard to the problem being addressed by the present inventors - improving the speed of heating up of a catalytic converter by modifying the design of a turbine housing and at least part of an exhaust manifold - finds no relevance in Davis.

Davis refers to the blower cover art in air conditioners. What is relevant in the air conditioner blower cover art does not apply to the art of turbochargers.

The housing of a turbine has very different features to those of an air conditioner blower cover. A turbine housing is designed to withstand extremely high temperatures because it accommodates very hot exhaust gases and a rotor that rotates

at speeds of over 250,000 rpm. An air conditioner blower cover does not have to withstand such extreme conditions.

The teachings by Davis would not suggest or motivate the person skilled in the art of turbochargers to apply to turbine housings the features of air conditioner blower covers.

Thus, there is no basis to assume that Kirchweger, Davis or Wolf motivates or suggests turbine housing made of sheet metal or a thermal connection of the exhaust gas manifold pieces with said turbine housing.

Therefore, Claim 1 is not unpatentable under 35 U.S.C. § 103(a) over Kirchweger in view of Davis and Wolf.

The Examiner has rejected claim 2 under 35 U.S.C. § 103(a) as being unpatentable over Kirchweger et al. (Patent Number 4,194,484), in view of Stratton et al. (Patent Number 4,912,122).

The Examiner has also rejected Claim 3 under 35 U.S.C. § 103(a) as being unpatentable over Kirchweger et al., in view of Stratton et al.

The position of the Examiner supporting both of these rejections can be found in page 6.

In response, Applicants respectfully submit to the Examiner that Kirchweger does not teach that the turbine housing and the branch pipe for connection with the exhaust manifold are made of sheet metal or that the exhaust gas manifold pieces are in thermal connection, preferably **sliding connection which maintains thermal contact**, with said turbine housing.

Thus, Kirchweger can not suggest or motivate combining features that does not teach with the features taught by Stratton.

Therefore, claim 2 and claim 3 are not unpatentable under 35 U.S.C. § 103(a) over Kirchweger in view of Stratton.

The Examiner has rejected claims 4-6, and 10-12 under 35 U.S.C. § 103(a) as being unpatentable over Kirchweger et al. (Patent Number 4,194,484), in view of the admitted prior art of Manfred et al. (Patent Number DE 100 22 052 A1).

The position of the Examiner can be found in pages 7, 8, and 9, first paragraph of the Office Action.

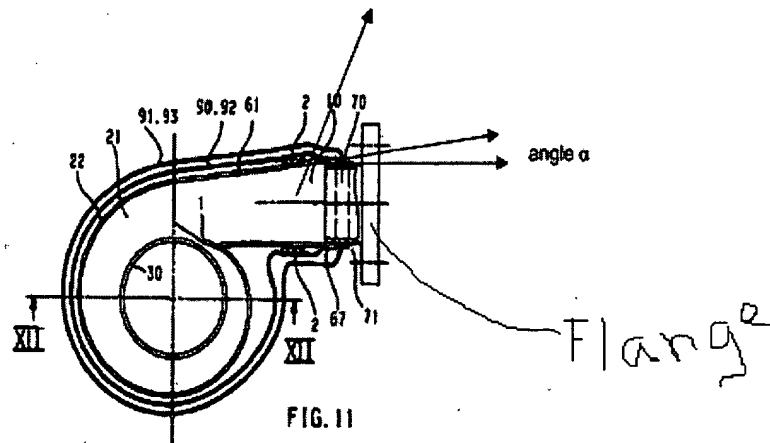
Applicants traverse the rejection to claims 4-6, and 10-12, based on the following grounds:

Kirchweger does not teach that the turbine housing and the branch pipe for connection with the exhaust manifold are made of sheet metal or that the exhaust gas manifold pieces are in thermal connection with said turbine housing.

Then, Kirchweger can not suggest or motivate combining features that does not teach with the features taught by Stratton.

Moreover, the Examiner contends that Manfred teaches "that it is conventional in the turbocharger art, to utilize said heat conductive connection being formed between first and second tubular elements"

Applicants submit that the Examiner fails to note that Manfred teaches a tubular element which is part of a flange element which is shown (unnumbered) not only in the Figures



Manfred **does not teach** a tubular connection **between a turbocharger and an exhaust manifold**. In fact, none of the Figures, in Manfred is directed to exhaust manifold parts.

Manfred discloses turbocharger with a flange element, wherein the flange element has a tubular part that is connected to the housing of said turbocharger. A flange connection disrupts or dissipates the heat conductivity between the turbine and the exhaust manifold.

In contrast, the instant invention is directed to a turbine housing and a branch pipe which is **directly connected** to the exhaust manifold by a tubular sliding connection **without any flanges**, without loss of heat conductivity from the exhaust manifold to the turbine.

Moreover, the Examiner alleges that Manfred teaches that the outer wall of the turbine housing is thicker than the inner wall. However, Manfred in column 3, lines 21-24 (as translated by Steve) suggest a turbine outer wall that is **no thicker** than the inner wall.

In other words, Manfred teaches away from a Turbine with a thicker outer wall than the inner wall.

Therefore, the skilled artisan would not be motivated to combined Manfred with features which Kirchweger does not teach. Manfred does not disclose either any suggestion or motivation with respect to features that could be combined with Kirchweger disclosure to make the present invention obvious.

Accordingly, claims 4-6, and 10-12 are not unpatentable under 35 U.S.C. § 103(a) over Kirchweger et al., in view of the admitted prior art of Manfred et al.

The Examiner has rejected claims 7 and 16 under 35 U.S.C. § 103(a) as being unpatentable over Kirchweger et al. (Patent Number 4,194,484), in view of the admitted prior art of Manfred et al. (Patent Number DE 100 22 052 A1), and further in view of Stratton et al. (Patent Number 4,182,122).

The Examiner's position can be found in page 10, top half, of the Office Action.

Applicants traverse the rejection of claims 7 and 16 by submitting that Kirchweger does not teach that the turbine housing and the branch pipe for connection with the exhaust manifold are made of sheet metal or that the exhaust gas manifold pieces are in thermal connection with said turbine housing.

Thus, Kirchweger can not suggest or motivate combining features that does not teach with the features taught by Manfred and Stratton.

Therefore, claims 7 and 16 are not unpatentable under 35 U.S.C. § 103(a) over Kirchweger in view of Manfred and Stratton.

The Examiner has rejected claim 8 under 35 U.S.C. § 103(a) as being unpatentable over Kirchweger et al. (Patent Number 4,194,484), in view of Stratton et al. (Patent Number 4,192,122, and further in view of Manfred et al. (Patent Number DE 100 22 052 A1).

The Examiner's position can be found in page 10, bottom half, and page 11, top half, of the Office Action.

Applicants counter the rejection to claim 8 by submitting that Kirchweger does not teach that the turbine housing and the branch pipe for connection with the exhaust manifold are made of sheet metal or that the exhaust gas manifold pieces are in thermal connection with said turbine housing.

Thus, Kirchweger can not suggest or motivate combining features that does not teach with the features taught by Stratton and Manfred.

Therefore, claim 8 is not unpatentable under 35 U.S.C. § 103(a) over Kirchweger in view of Stratton and Manfred.

The Examiner has rejected claims 9 and 17-18 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Kirchweger et al. (Patent Number 4,194,484), in view of Kohl et al. (Patent Number DE 33 34 413 A1).

The Examiner's position can be found in page 11, bottom half, of the Office Action.

Applicants traverse based on the following grounds:

Kirchweger does not teach that the turbine housing and the branch pipe for connection with the exhaust manifold are made of sheet metal or that the exhaust gas manifold pieces are in thermal connection with said turbine housing.

Kohl teaches an insulation layer made of textile tissue on top of the outer surface of the exhaust manifold system (see Kohl Figure in page 11). However, Kohl **does not teach** a layer of insulating material between an inner wall and an outer wall of a turbine housing.

Therefore, the teachings in Kohl would not suggest or motivate the skilled artisan to any combination with Kirchweger.

Accordingly, claims 9 and 17-18 are not unpatentable under 35 U.S.C. § 103(a) over Kirchweger, in view of Kohl.

The Examiner has rejected claims 13-14 under 35 U.S.C. 103(a) as being unpatentable over Kirchweger et al. (Patent Number 4,194,484), in view of Stratton et al. (Patent Number 4,192,122), and further in view of Chen et al. (Pub. Number US 2004/0142152 A1).

The Examiner's position can be found in page 12, top half, of the Office Action.

Applicants respond to the rejection to claims 13-14 by submitting that Kirchweger does not teach that the turbine housing and the branch pipe for connection with the exhaust manifold are made of sheet metal or that the exhaust gas

U.S. Application No.: 10/726,760
AMENDMENT B

Attorney Docket: DKT02164

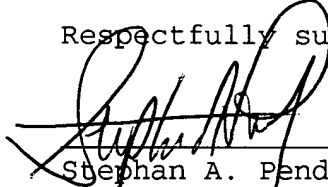
manifold pieces are in thermal connection with said turbine housing.

Thus, Kirchweger can not suggest or motivate combining features that does not teach with the features taught by Stratton and Chen.

Accordingly, claims 13-14 are not unpatentable under 35 U.S.C. § 103(a) over Kirchweger, in view of Chen.

Withdrawal of the rejections and early issuance of the Notice of Allowance are respectfully requested.

Respectfully submitted,



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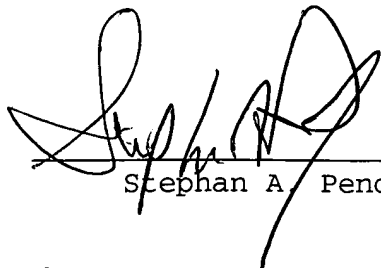
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Date: **August 23, 2005**

CERTIFICATE OF MAILING AND AUTHORIZATION TO CHARGE

I hereby certify that the foregoing AMENDMENT B AND REQUEST FOR TELEPHONE INTERVIEW for U.S. Application No. 10/726,760 filed December 3, 2003, was deposited in first class U.S. mail, with sufficient postage, addressed: Mail Stop RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on **August 23, 2005**.

The Commissioner is hereby authorized to charge any additional fees, which may be required at any time during the prosecution of this application without specific authorization, or credit any overpayment, to Deposit Account No. 16-0877.



Stephan A. Pendorf